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ABSTRACT

Findings of a study that examined whether individual teacher attributes or organizational conditions influence classroom pedagogical practices in southern Africa are presented in this document. Methodology involved observation and administration of a questionnaire to 244 secondary teachers in Botswana. Findings indicate that teacher behaviors in southern Africa were quite uniform and simple. Moderate variation in technical complexity among teachers was observed, including; (1) the range of frequency in utilizing textbooks and other basic tools; (2) time spent on academic tasks; and (3) the complexity of questions that teachers ask students. This variation can be explained both by factors emanating from the institutional environment, such as curricular traditions, and by formal rules and materials that are manipulated by state actors, such as textbook supply. Sharp variation in ethnic and gender characteristics of teachers were not significantly related to pedagogical behaviors, which suggests that the classroom institution acts to moderate individual differences among young teachers. Five tables are included. (Contains 40 references.) (LMI)

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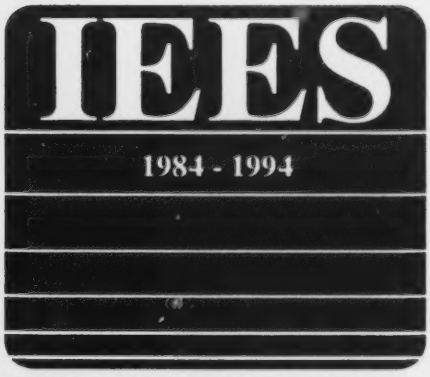

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RESEARCH REPORTS

TEACHERS RITUALS, ORGANIZED SACRILEGE: The Classroom Institution in Southern Africa

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November 1991

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TEACHER RITUALS, ORGANIZED SACRILEGE:
The Classroom Institution in Southern Africa

Abstract

The Western state — aiming to alter behavior of individuals within institutions — often employs one of two organizational strategies: either bureaucratic controls over members are exercised (vertically) by central agencies; or the state hopes to boost the professional or normative commitment of individual members to innovations (horizontally). Within the classroom institution, however, evidence from the U.S. reveals that teacher behavior is usually quite uniform and highly routinized. Regulatory and professional strategies fail to sufficiently recognize the intractable character of teachers' behavior, and rarely backup to assess surrounding institutional forces that reinforce ritualized pedagogical scripts.

We find that the action of teachers in southern Africa is quite uniform and simple, based on repeated in-class observations of 244 secondary school teachers. Moderate variation in technical complexity among teachers is observed, including (a) the range and frequency in utilizing textbooks and other basic tools, (b) time spent on academic tasks, and (c) complexity of questions put to students by the teacher. This variation in technical complexity can be explained both by factors emanating from the institutional environment (e.g., curricular traditions) and by formal rules and materials which are manipulated by state actors (e.g., textbook supply). Sharp variation in ethnic and gender characteristics of teachers holds no consistent relationship with pedagogical behaviors, suggesting that the classroom institution acts to even out individual differences among young teachers.

OVERVIEW: EXPLAINING VARIATION IN TEACHERS' ROUTINES

After four decades of research in classrooms, much is known about the pedagogical behaviors that teachers *should* exhibit (for reviews, Wittrock 1986; Walberg 1991). Yet several empirical studies, conducted mainly in the United States, consistently show that most teachers display uniform and simple pedagogical routines, reinforcing passive social roles for students (Flanders 1965; Goodlad 1984; Anderson and Burns 1989). The principal organizational problem is not specifying what teachers should do, but rather how to *thaw-out ritualized teaching practices* and *loosen contextual constraints that reinforce these pedagogical routines*.

State actors in the United States, under recent waves of "school reform," are revisiting two basic organizational strategies for changing the behavior of classroom teachers. In the early 1980s, top-down regulatory controls were attempted, including standardization of curricula, a deepening of statewide testing schemes, even inspecting classroom behavior of novice teachers. In reaction to this first wave, more horizontal professional-development strategies have been advanced by state actors. Here behavioral change within schools is seen as stemming from contextual forces (for instance, working conditions) which raise teachers' professional or normative commitment to organizational objectives or innovations (for reviews, Elmore 1990; Johnson 1991).[2]

Both strategies assume that (a) the uniform and simple teaching technologies employed by most teachers can be *altered* and made *more complex*, and (b) any observed variability in teaching practices — a possible source of innovative pedagogical practices — *can be manipulated* through intentional, organized action. We argue that rather than making these strong assumptions about the flexibility of the classroom institution, interventions might be preceded by an assessment of how much "natural variation" actually exists in teachers' behavior. Then, we can backup and ask whether this variation is linked to deeply entrenched institutional forces, *or* whether behavioral variability in the classroom corresponds with (more manipulable) policy levers.

In this paper, we first report on the technical simplicity of pedagogical practices exhibited by 244 secondary school teachers in the southern African nation of Botswana. Empirical evidence is accumulating which suggests that normative teaching behavior (albeit rather uniform across teachers) does vary between North American and East Asian settings (Stevenson et al. 1986). But very little empirical evidence is available on normative teacher behaviors and social rules found in classrooms of other societies.

Second, we focus on the modest variability found among Botswana teachers in (a) the range and frequency with which instructional tools are mobilized; (b) the amount of time spent on teacher-dominated academic tasks; and (c) the frequency and complexity of questions directed by teachers to students. We then relate this variation in pedagogical complexity to institutional and policy-manipulable forces operating from the surrounding environment: new teachers' ethnicity and gender, and links to teacher-selection policies; subject matter being taught; tenure and salary levels; and the supply of textbooks and basic instructional materials. Pedagogical routines may reflect the types of young people entering teaching *or* the institutional conditions they find upon entering the school. And where variation in teacher behavior is observed, it may be explained by differentiation within the institutional environment, such as curricular traditions (which may prove impervious to discrete policy assaults by state actors).

We begin by reviewing the theoretical debate over whether the classroom as an *institution* can be penetrated from the outside. This helps frame discussion over the likelihood that regulatory or professional-commitment remedies are likely to dislodge, and make more complex, the simple routines followed by teachers. Then, we will describe the southern Africa study. Finally, our explanatory models test whether individual attributes of teachers or surrounding organizational conditions help to explain the modest amount of variability discovered in these classrooms.

THE CLASSROOM: A PERMEABLE ORGANIZATION OR BOUNDED INSTITUTION?

Decades of research in U.S. classrooms reveal that most teachers perform homogenous and technically simple pedagogical routines. Normative behavior of teachers also has remained remarkably constant over time in the United States (Cuban 1984). Policymakers and local educators, nevertheless, remain optimistic that organizational strategies can be mounted which will significantly alter teachers' behavior.

Underlying this contradiction rests a fundamental organizational issue: *How penetrable are the boundaries of the classroom institution?* The theoretical debate has been long and heated: Does the *local school* operate as a functional open-system, sensitive to surrounding cultural commitments and pressures from other formal organizations, including interventions by the state (Durkheim 1956; Dreeben 1968; Bidwell and Kasarda 1975)? Or does the school and *classroom organization* buffer and de-couple from these environmental pressures, allowing the teacher to pursue pedagogical practices and social rules that may *not* fit the local priorities or even be functional in raising children's achievement (Meyer and Rowan 1978; Chubb and Moe 1990)?

Both (vertical) regulatory and (horizontal) professional-development strategies intend to penetrate into the classroom and alter the behavioral scripts of teachers. Both strategies have developed, in part, in reaction to a realization that controls, incentives, and cultural means of spurring more complex teacher behavior have been very weak under the highly decentralized U.S. model of school organization (Scott and Meyer 1982; Rowan 1990). A wide range of efforts have been initiated over the past decade, representing a variety of strategies for penetrating the boundaries of the classroom, ranging from simplifying and *regulating* teachers' implementation of curricula or certifying new teachers on the basis of their classroom behavior — to revisiting school-level management and teacher participation, creating new roles for good teachers, and redoubling incentives for *professional development* activities (Fuhrman, Clune, and Elmore 1988; Rowan 1990).

An alternative way to inquire about the permeability of the classroom institution is to ask: What forces in the *institutional environment* (a) reinforce the simple routines that most teachers follow, or (b) help to explain modest levels of pedagogical variation revealed in some classroom studies? Rather than mounting initiatives which attempt to directly puncture the classroom's boundaries, or to faithfully assume that teachers' desire for professionalism will spark pedagogical change, it is important to locate surrounding curricular traditions, characteristics of incoming teachers, and forms of training and socialization which may combine to cast normative practice. Variation in the institutional environment (e.g., the socialization of math versus social studies teachers) may correspond to

the range of pedagogical variability observed in classrooms. This will not always be an uplifting exercise — since discrete policy measures or local action may effectively alter resilient institutional forces only over long stretches of time, or not at all.

An Evolving Institutional View of the School and Classroom

Early work on the school organization — from an institutional-theory viewpoint — provided evidence on three important claims. First, the school and classroom differ from other formal organizations in that goals often are multifaceted, even contradictory. During the rare instances when a consensus *is* apparent on learning objectives, the "core technology" (how to link teaching practices and tools to actual learning outcomes) often remains poorly understood. Second, coordination and control of teachers is often absent or ineffective. Third, when bureaucratic forms of control are attempted from above, the school organization shows remarkable ingenuity in buffering these "external" pressures, sealing-off and de-coupling the classroom from the formal bureaucratic structure sitting above the classroom (Weick 1976; Meyer and Rowan 1978).[3]

Significant variation in teaching practices, however, is apparent across different settings. This suggests either (a) that the character of entrants into teaching differs across nations and among local settings, or (b) that environmental forces vary situationally and that these external factors, under some conditions, *do* penetrate into the classroom. We will return to the critical issue of whether these environmental forces are *institutional in character* rather than being composed of surface-level rules and organized interventions (i.e., displaying strong acceptance and legitimacy, reproduced through non-conscious organized action, and largely immune to manipulation by state actors).

Sources of Teacher and Classroom Variation: Surface Rules and Institutionalized Rituals

To understand levels of uniformity or variability in teachers' behavior, we might backup to assess the homogeneity or variation found within and across different institutional environments. To date, this is a scanty empirical literature. Yet *variation in teacher behaviors and beliefs* has been observed along four dimensions linked to institutional conditions: (a) among individuals who are selected into teaching jobs based on variable background characteristics; (b) across different classrooms and subject areas *within* schools; (c) *among* different schools; and (d) across different nations or cultural settings.

Variation in teacher background and selection practices. Institutional rules, resources, and forms of status largely determine who enters teaching. In turn, variation in teachers' background, skills, and motivation may influence their actual teaching behaviors. The counter-argument is that pedagogical scripts are so highly institutionalized that variation at the individual level matters little. Empirical evidence from the United States does suggest that variability in individual teachers' cognitive proficiencies, expectations for student performance, and knowledge of more complex instructional strategies is related to variation in pupil achievement (for review, Anderson and Burns 1989). Within Third World countries, social class and educational backgrounds of students entering teacher training programs can vary enormously. This variation in teachers' level of schooling, specific language proficiency, and class origins often is empirically related to the performance of their pupils (Fuller 1987). This suggests that teacher selection policies and institutional practices are quite important in explaining variation in teacher behavior. On the other hand, the school's capacity to socialize even the most creatively trained novice teacher in simple pedagogical methods also has

been observed in the U.S. and the Third World (e.g., Cohen 1990; Prophet and Rowell 1991).

Individual variation might interact with differing forms of socialization found within different local schools. Based on nationwide survey data from the U.S., for instance, Rowan, Raudenbush, and Kang (1991) found that female teachers and black teachers perceived greater control of their work, held more favorable attitudes toward their principal, and felt more cooperation among their colleagues, compared to male and white teachers. Such findings do suggest that individual background *interacts* with institutional practices (which are linked to the selection of new teachers) to shape variation in teachers' beliefs related classroom behavior.

Variation in teacher behavior within schools. The *subject matter* being taught appears to drive variation in pedagogical behavior. In the U.S., for instance, Stodolsky (1988) found that math teachers tend to be more dominant in the classroom, to employ simpler instructional tools, and to ask more closed-ended questions, compared to social studies teachers. Curricular subjects also differ in terms of the social rules that are more likely to be set by teachers. For example, formation of pupil workgroups appears to be more common in reading classes, compared to math classes which tend to be more didactic (Barr and Dreeben 1983).

The character of subjects or knowledge, and corresponding pedagogical behaviors, come to be viewed as legitimate and embedded in classroom scripts. On the other hand, the state (or curricular associations) provide textbooks, teacher guides, and preservice training which may contain variably formalized *rules* for how specific subjects should be instructed. This explicit manipulation of the surface (official) structure may dislodge previously institutionalized forms of behavior. The interplay between surface structure (the focal point of centralized states) and institutionalized practices has received little empirical attention.[4]

Student attributes and the institutional arrangement of curricular tracks also may lead to variation in pedagogical behaviors. In the U.S., students from lower status background often are subjected to more frequent control, academic tasks of lower complexity, and more routine questioning by teachers (Carew and Lightfoot 1979). The Rowan et al. (1991) study shows that teachers working with children in lower tracks hold more negative perceptions of their own efficacy and overall working conditions, which may influence their pedagogical behavior.

Variation in teacher behavior among schools. Actions and beliefs of teachers also may vary across schools that either display differing *organizational features* or are situated in differing *national contexts.*

Much of the research on school institutions simply correlates organizational features with student achievement levels. For instance, empirical findings showing that achievement tends to be lower in larger (North American) schools are important from a policy standpoint (Fowler and Walberg 1991). But this work fails to illuminate *how* school size or other organizational attributes influence teachers' behavior or beliefs which, in turn, shape pupil performance. This first step in a causal model is beginning to be illuminated. Rowan et al. (1991), for instance, found that teachers in Catholic schools feel greater control over their work and hold more positive perceptions about their

work setting than do public school teachers (on actual organizational mechanisms, also see Bryk, Lee, and Smith [1990]).[5]

Few studies have focused on the degree of uniformity in teaching behavior across nations or cultural settings. We do know that national curricular structures worldwide have been converging over the past century (Benavot et al. 1991). But are the behavioral scripts of teachers also becoming more similar, despite variation in the local communities and cultures? Or might variation in national institutional conditions drive variability in teaching practices and social rules found in classrooms among different societies?

One recent observational study of teacher behavior in three developing countries (South Korea, Nigeria, and Thailand) found quite similar pedagogical routines. The bulk of time was spent with the teacher talking at children, demanding choral recitation to factual questions, with significant slices of time spent on individually performed exercises (Anderson, Ryan, and Shapiro 1989).[6] Cross-national studies which include west European and additional east Asian schools reveal sharper variation in teachers' normative scripts. Stevenson and Baker (1991), for instance, show that teachers cover a larger proportion of the "intended curriculum" in nations with stronger central controls.[7]

In Japan, teachers organize the classroom differently from their North American counterparts. Japanese teachers tend to play a more central role in the classroom, yet they more often facilitate discussion of material, organize exercises which are performed laterally in workgroups, and stigmatize incorrect responses less, thereby encouraging greater effort by pupils in volunteering opinions and answers (Stevenson et al. 1986).

TEACHER RITUALS AND PEDAGOGICAL VARIATION IN SOUTHERN AFRICA

The Botswana Classroom Study

To explore alternative sources of variation in a Third World setting, we initiated a study of teacher behavior and the classroom's social rules in southern Africa. In 1988, we piloted a classroom observation instrument with 154 junior secondary school teachers in Botswana, adapting Jane Stallings' observational tool (Stallings and Freiberg 1991). We also field tested a teacher questionnaire which inquires about social class and educational background, beliefs about formal schooling and classroom structure, and levels of motivation.[8] In 1989, we began the full study, sampling 310 teachers for observation, working in 44 junior secondary schools.

In this paper, we focus on those *individual and contextual antecedents* that possibly influence variation in teachers' classroom behavior. The classroom may operate as a closed institution, insulated from environmental variability and effective in socializing teachers from various backgrounds to follow homogeneous and routine pedagogical scripts. On the other hand, the four sources of individual and institutional variability, under some conditions, may penetrate the classroom organization, helping to drive variation in teacher behavior.

The Botswana setting allows us to study whether teachers who differ dramatically in their *ethnic and social-class background* actually exhibit differing behaviors in the classroom institution. Of our

final sample of 244 teachers (observed twice and with complete data), 26% were non-African expatriates, reflecting the government's continued reliance on the Peace Corps, British and Scandinavian volunteers, and Indian nationals to serve as secondary school teachers. In addition, teaching is one of the few wage-sector jobs available to young *women*; 40% of our final sample were females. If the school and classroom institution acts to swamp individual differences and to homogenize pedagogical behaviors, this sharp variation in teacher background would be moderated.

The major explanatory contextual variables relate to the teacher's curricular role (grade level and subject-matter being taught), level of pre-service teacher training, and length of tenure. Finally, we assessed the level of basic instructional materials available to the teacher. Only the supply of textbooks per pupil proved to be related to teacher behavior. (The availability of instructional materials is quite good overall in Botswana, especially relative to other African countries.)

Teacher-behavior outcomes. The first question we ask of the classroom institution: What are the typical pedagogical scripts that teachers follow? Second, how much variation in teacher behavior is observed on either side of average levels? Third, can individual or contextual factors explain significant portions of this variance? We report on normative levels and variation in teacher behavior for the following areas: (l) The simplicity or complexity of instructional tools mobilized by teachers, (2) task demands placed on pupils by the teacher, especially the frequency of active reading and writing exercises, (3) the frequency and complexity of questions put to students by the teacher, (4) the consistency of the teacher's "pedagogical technology" over time, and (5) typical ways in which instructional time is utilized, particularly dominant types of actions exhibited by the teacher during a class period.

These particular dimensions of teaching behavior and classroom social structure focus on the level of task complexity, as well as the vertical character of authority and activity which is structured by the teacher. At least within Euroamerican settings, pupil achievement is higher when teachers infuse tasks and cognitive demands with moderate levels of complexity and actively involve students in the subject matter (for reviews, Anderson and Burns 1988; Carlsen 1991; Walberg 1991). We will soon see that teachers in Botswana usually reduce complexity and act to maintain their strong central authority in the classroom. In this way, teacher behavior is ritualistic, reproducing social roles and forms of power, but not serving the technical goal of boosting student achievement. Levels of reliance on such ritualized scripts, however, do vary significantly.

Teacher sample. In each of 44 junior secondary schools, about seven teachers were selected from Form 1 and Form 2 (equal to grades 8 and 9 in U.S. terms). For each school, the seven-teacher sample included a Setswana, English, mathematics, social studies, science, agriculture, and home economics teacher. Setswana is the national language, spoken by the dominant Tswana tribe. English, however, is the language of instruction for all other subjects. Each selected teacher was observed during at least two 40-minute class periods over one week. In addition, each participating teacher was asked to complete a questionnaire which covered background information. The final sample with usable data includes 244 teachers. Forty percent (40%) are female teachers. Twenty-six percent (26%) are non-African expatriates. Ninety percent (90%) of the African teachers are native Botswanans.

Classroom Observation and Reliability Issues

In adapting the Stallings observation instrument for Botswana classrooms, we chose those behavioral items that involved low levels of inference on the part of our trained research assistants (University of Botswana students). Data reported in this paper stem from five segments of the observation instrument. The observer, during the first ten-minute segment, records basic information about the number of children in the classroom, the subject being taught, and the visible supply of basic instructional materials: textbooks, exercise books, pencils, a chalkboard. Segment 2, running for seven minutes, includes a two-dimensional matrix in which the researcher checks the observed teacher behaviors and what, if any, instructional tool is being utilized (e.g., teacher lecturing at children, working from a textbook). This matrix is repeated, over the seven-minute Segment 3, for a cluster of four pupils randomly selected by the observer, checking the dominant behavior and which tools students are employing. Segment 4, covering the next ten minutes, requires the observer to tally the frequency and type of questions being asked of the entire class or individual pupil. Segment 5, completed during the final five minutes, asks the observer to estimate how the teacher spent class time, percent of teacher talk in English or Setswana, and additional summary items.

The behavior/tools matrix yielded dichotomous measures (observed, not-observed check marks). Other measures were continuous in nature, such as estimates of teachers' time use. *Inter-observer reliability checks* were done for 33 pairings, which included each of the eleven research assistants involved in the classroom observations. Cohen's kappa values (K) were calculated for all dichotomous measures, which indicate the percent agreement between two observers, adjusting for agreement due to chance. Any measure that fell below K=.70 was excluded from further analysis.[9]

Descriptive Findings

Teacher background and subject specialties. In Table 1 we report basic characteristics of teachers included in our sample. Descriptive statistics are split by teacher gender, African versus expatriate teachers, and mathematics versus social studies teachers (the latter two subjects chosen for illustrative purposes).

Female teachers come from more affluent (or less poor) households, although the mean differences are not statistically significant. Note that junior secondary school teachers are quite young, with female job tenure averaging just 3.9 years, 4.6 years for males. This is due largely to the fact that the junior secondary school system has expanded rapidly only during the past decade. Pre-service training levels are similar with 28% of the females holding at least a diploma from a (two-year) teacher training college, 31% for males. Females more commonly teach English and Setswana subjects; males are slightly over-represented, but not dramatically so, among the ranks of mathematics and social studies teachers.

Expatriate teachers predictably differ from African teachers. Salary levels are similar, since the bulk of expatriate teachers are either young volunteers receiving stipends or white Botswana residents who have gone on to the civil service pay schedule. Expatriates are concentrated in English (60% teach this subject). Note that a larger proportion of African teachers (20%) than expatriates (13%) instruct math classes.

We will report on how math teachers behave quite differently and organize their classes in ways

which depart from those of teachers working in other subjects. But the individual backgrounds of math teachers are *not* distinct from all other teachers. The comparison in Table 1 is with social studies teachers. But similarities in social class background, tenure, and salary are also observed among teachers in other subject areas. We did find, however, that the observed presence of textbooks was higher in math classes, .85 books per pupil, compared to .76 for all other types of classes ($p<.01$). Math teachers also earn more money, with annual salaries running 10% higher ($p<.05$).

Similarities and differences in Pedagogical behavior. In Table 2 we report on selected teacher and pupil behaviors for the same teacher categories. Pupils in classrooms taught by females tended to use a fewer number of instructional materials per observation segment (3.1), compared to children within classes led by male teachers (3.6). This difference approaches statistical significance ($t=1.81$, $p<.07$). Female teachers tended to be more dominant and verbal in the classroom, with 78% of class time spent talking at children and engaging in choral recitation, versus 73% for male teachers (not statistically significant). Male teachers spend more time monitoring students as they perform written exercises (22% for males versus 16% for females; $p<.05$). Female teachers asked 6.3 closed-ended questions over the observation segment (10 minutes in length), versus 5.4 questions for male teachers.

Overall, both female and male teachers exhibited a simple pedagogical routine, relying heavily on lecture and oral recitation. A small number of instructional tools were utilized by most teachers. Very few questions were ever asked of individual pupils.

In columns 3 and 4 (Table 2) we contrast pedagogical behaviors of African and expatriate teachers. Overall the patterns are quite similar. Pupils in classrooms led by an African teacher were observed to be using fewer instructional tools, 3.2 per observed segment versus 3.9 within classrooms led by an expatriate teacher ($p<.01$). This is mainly due to the fact that exercise books were used twice as often by pupils in the classrooms of expatriate teachers (not shown in Table 2). African teachers were more dominant in the classroom, with 78% of instructional time dedicated to lecturing and choral recitation, versus 67% for expatriate teachers ($p<.001$).

In columns 5 and 6 (Table 2) we focus on pedagogical differences displayed by math teachers. Again, the comparison with social studies teachers is illustrative and not unrepresentative of differences between math and other subject areas. Math teachers mobilize pupils to use a greater number of instructional tools: 4.7 in math classes versus 2.8 in social studies (for math versus non-math classes, $t=5.60$, $p<.0001$). Pupils are required to write more consistently in math classes ($p<.001$); they must respond to more closed ended questions ($p<.01$) and *fewer* open-ended questions ($p<.0001$). Math teachers are less dominant during the instructional process, lecturing 70% of the time, versus 76% for all other teachers and 88% for social studies teachers. Our multivariate models will show that these curricular effects, especially for math teachers, remain significant after holding constant other factors.

Consistency of Teacher Behavior Over Time

How much variability in pedagogical behavior is due to time? That is, are the instructional tools and social roles mobilized and enforced by the individual teacher consistent, or unstable, from lesson to lesson? One way to assess the level of consistency in teacher routines over time is to

simply assess what proportion of the total variance in specific behaviors is attributable to between-teacher variation versus variation attributable to within-teachers (across multiple observations over time; Maxwell, Camp, and Arvey 1986). Anderson and Burns (1989), focusing on the consistency of teacher behaviors in the United States and Europe, found that *less than half of the total variance* was attributable to between-teacher differences (reporting the *eta*-squared for a oneway ANOVA). In Botswana, however, the proportion of total variance attributable to between-teachers for our nine (dependent) pedagogical behaviors ranged from .58 to .72 (mean *eta*-squared = .64). The residual error variance attributable to the two repeated observations is quite modest. Botswana teachers appear to be more consistent, due largely to the simplicity of their pedagogical routines.

A second method for assessing this level of stability (with continuous behavioral measures) is to calculate Spearman rank-order correlations among teachers over multiple observations. Stallings and Freiberg (1991), for instance, found that teacher behaviors in early primary grades (within the U.S.) were quite consistent with rank-order correlations of between .80 and .90. In Botswana, consistency in pedagogical behavior between the first and second observation was lower. Across our nine teacher behaviors, the rank-order correlations ranged between .30 and .50. Again, this is largely an artifact of the simplicity of technology utilized by the majority of teachers in Botswana. If we focus on whether a particular instructional tool was utilized at all (not frequency of use, which was usually quite low), then teacher behavior is quite consistent. For example, 65% of all teachers lectured at the class in *both* observations (i.e., the seven-minute segment during which the teacher's behaviors were recorded). Another 8% lectured in *neither* the first nor the second observation. Just 27% of all teachers were inconsistent in lecturing during one (seven-minute segment of the) observational period but not the second. Similarly, 26% of all teachers employed a textbook in *both* observations; 43% used a textbook in *neither* observation. Just 30% employed a text in one observation but not the other. We did model levels of consistent use of basic instructional tools, the results of which are reported below.

Explaining Variation in Teacher Behavior: Individual and Institutional Factors

The next step in our analysis was to ask whether differences in teachers' individual backgrounds, training and socialization, and/or institutional roles (especially subject-matter specialties) help to explain modest levels of variation found in pedagogical practices. We were particularly curious as to whether ethnic and gender differences among teachers better explained behavioral variability, relative to curricular roles and socialization shaped by the school institution. Does the simplicity and consistency of pedagogical routines — reinforced by institutional forces — stamp out individual differences of young teachers?

Complexity of instructional tools. In Table 3, we regress the number of instructional tools utilized in the classroom over the two observations on individual background characteristics, curricular roles, training and tenure (socialization) levels, grade level, and textbook availability per pupil. We also ran these models separately for male teachers (where proportions of explained variance were generally highest) and for African teachers.

Findings were stronger when actual pupil behavior was being observed (columns 4-6). Ethnic and gender characteristics of teachers were unrelated to pupil behavior. Math and English teachers consistently used more instructional tools with greater frequency. Interestingly, however, the num-

ber of textbooks observed per pupil was *negatively* related to the total number of instructional tools utilized by pupils. Note that these models are remarkably similar, regardless of whether we look at all teachers, males only, or just African teachers.

In Table 4, we focus on two commonly utilized instructional materials: textbooks and pupil exercise books. Pupils utilized textbooks more frequently in English and Setswana classes, and this tendency was observed for Form 2 classes (except among African teachers, column 3). Textbooks also are-utilized more frequently in Form 2 classes. Use of exercise books is more frequently observed in math classes, and less frequently observed where textbooks were more widely available. Both female and African math teachers tended to use exercise books less frequently (columns 4 and 6). This is the first instance where the individual background of teachers is related to actual pedagogical behavior.

Consistency of teaching technology. We looked at variation in the consistent use of textbooks and exercise books between the two observations. Remember that most teachers are rather consistent in the types and number of instructional tools they use over time. Math, English, and Setswana teachers tend to be *less* consistent in their use of these tools. This, however, may be an artifact: it is teachers in these same curricular subjects that use these tools more frequently overall. Teachers in the other subject areas tend to be more consistent, since they rarely use a complex set of instructional tools. Except for African math teachers (interaction effect), individual background makes no difference on technical consistency.

Task demands placed on students. Our basic model could not explain significant portions of the variance in the frequency with which pupils were observed reading textbooks or other material. However, when looking at the frequency with which pupils must write in class, significant shares of the variance can be explained based on background and contextual factors (Table 5). Individual differences play a slightly larger role in this area of task demands. For African teachers (column 3), females tend to require more frequent written exercises. On the other hand, female math teachers (GENDER x MATH) demand written tasks less frequently. Math teachers overall organize more written exercises. Textbook availability is negatively related to assignment of written work (an apparent substitution process, whereby teachers who rely on the textbook demand less writing).

Another facet of task demands relates to the frequency and form of questions posed by the teacher. Above we reported the low frequency with which teachers put questions to students. Our basic model failed to explain what little variation was observed in the total number of questions teachers posed during this ten-minute segment. We are able to explain some of the variation in the number of *open-ended questions* asked of pupils by the teacher. Individual background makes little difference. Math teachers, not surprisingly, ask fewer open-ended questions, with this relationship reaching statistical significance for African teachers. For African teachers, longer tenure or experience is positively related to posing more complex questions. Still, just 16% of the variance can be explained, in part due to the infrequency with which questions are asked by teachers (results appear in columns 1 and 2 of the appendix).

We also looked at the ratio of the number of teacher questions directed at the entire class (usually requiring choral recitation) divided by the number directed to an individual pupil. The mean

value of this ratio equaled 20:1. We cannot explain significant portions of the variance in this ratio. Language teachers (English and Setswana) do tend to direct more questions to an individual pupil, although only the Setswana effect is statistically significant ($p<.05$). Among males, African teachers tend to direct more questions to the entire class (interaction effect; $p<.05$).

Use of instructional time. Teachers spend the bulk of time standing before the class, lecturing at largely passive pupils, at times demanding choral recitation as detailed above. We attempted to model what variation is observed around this typical pedagogical script. Overall, proportions of variance explained are not impressive. Yet certain relationships are important. Main effects show that both female and African teachers tend to be *less* dominant in the classroom (appendix, columns 3 and 4). Teachers with higher levels of training tend to be *more* dominant. Among African teachers, those with longer tenure spend *less* time lecturing at pupils. More highly trained teachers do spend more time monitoring (written) pupil exercises (columns 5 and 6).

CONCLUSIONS: INSTITUTIONAL CONCEPTIONS OF CLASSROOM INTERVENTIONS

This study yields three basic findings. First, teachers' behavior in Botswana classrooms is simple, involves few instructional tools, and is teacher-centered. Most communication occurs between the teacher and the full class of students; instructional routines rely on didactic instruction. This finding is quite similar to empirical studies of classrooms in the United States.

Second, we find that teacher routines are consistent over time (in terms of which instructional tools are utilized, vertical questioning behavior, and how instructional time is spent). This is in contrast to North American and European classrooms where teacher routines appear to be more variable, perhaps due to wider variation in available instructional materials.

Third, the modest amount of variation observed among Botswana teachers is explained significantly by organizational rules and inputs, as well as by more deeply institutionalized forces. Individual differences among teachers only occasionally help to explain behavior variation. We did not even detect any major differences in how native Botswana and expatriate teachers behave in the classroom. Female teachers do tend to assign and monitor more written exercises, after controlling for the subject being taught. This is the only individual-level effect observed.

Consistent effects — across a range of pedagogical behaviors — stemmed from the subject being taught and the availability of textbooks. These mechanisms, in Botswana, may represent a blend of explicit rules and institutional forces. The mathematics curriculum, for instance, is set by the central ministry of education and enforced through national examinations. But it may also be that mathematics or Setswana teachers are trained and socialized differently during their preservice training. The institutionalized character of different forms of knowledge, math versus social studies for instance, also may influence teacher behavior. Illuminating how these underlying mechanisms operate is beyond the scope of this study. Future work should sort out how the surface structure (rules set by the state or curricular associations) interacts with more deeply institutionalized understandings held in teachers' heads about normative pedagogical practices.

What are the implications of these findings for crafters of school interventions? In both the United States and the Third World disaffection with centrally planned, regulatory interventions continues to grow. Predictably, renewed enthusiasm for "professionalizing" the role of teachers has followed — improving pedagogical practices from the ground up (for review, McLaughlin 1990).

An institutional conception of the classroom, however, emphasizes that pedagogical routines are reinforced both by surface rules (at times efficaciously moved by the state) *and* by less formalized norms, socialization processes, and ritualized practices which together shape what "competent teaching" means to the typical teacher. These subjectively held understandings and routines may vary across societies, even among distinctly different types of schools. But to the extent that teachers within a shared form of schooling are selected and socialized toward similar understandings of what "teaching" is, their behaviors become more convergent, less open to particularistic surface rules and sacrilege pushed by external agencies. Institutionalized pedagogical routines are reinforced by a constellation of institutional forces that are not entirely static (e.g., national examinations and syllabi, teacher training colleges, and macro constraints on the supply and character of instructional materials). But unless the implicit norms of these institutional agents are addressed, the social habits of teachers and students are unlikely to change significantly.

Teachers have grown accustomed to seeing successive layers or lines of new interventions coming down from the state — and equally accustomed to buffering these intrusions when they fail to blend into their indigenous pedagogical routine (Cohen 1990; Meyer, Nagel, and Snyder 1991). Efforts that simply aim to fine-tune intention-filled action by the state or celebrate the delegation of authority to school-level "professionals" will fail to address the array of institutional forces which serve to reinforce the simple pedagogical rituals that persist in most classrooms.

ENDNOTES

1. This paper stems from the *Botswana Teacher, Classroom, and Achievement Study*, supported by the Botswana government and the U.S. Agency for International Development (USAID).

2. Market-oriented reforms — school choice and voucher remedies — still rely either on regulatory control or professional-commitment models. The difference is that these processes are seen as operating locally and driven by parental pressure. School choice interventions are equally unspecific in explaining how the boundaries of the classroom institution are to be penetrated, dislodging pedagogical routines and making instructional practices more complex technically.

3. Central to institutional theory is the argument that organizations adapt to their environment in order to maintain flows of resources and legitimacy. Yet the mechanisms for adaptation often act to buffer external intrusions into the core activities or interests of the organization's members (Selznick 1949; Meyer and Rowan 1978). The buffering of external demands is more difficult when the organization' s core technology is clearly defined and must operate efficiently to survive competition from other firms. Here changes in the *technical environment* (advances in production processes, for instance) lead to quick adaptations of the core technology within firms. But when the core technology is ambiguous, where inputs and human processes are linked to outputs in unclear ways, organizations can adapt to pressures from the *institutional environment* and decouple core activities from the market or bureaucratic superstructure (for review, Scott 1987). School districts, for example, rapidly created new offices and specialists for the panoply of categorical school programs that rained down from the state in the 1960s and 1970s. But whether these initiatives changed the behavior of teachers is questionable (Rowan 1982).

4. The state may "selectively couple" with the local teacher, influencing pedagogical behaviors through centralized national syllabi and examinations. Here selective coupling — altering the sanctioned *rules* of behavior — is conditioned by the high legitimacy of these state mechanisms, outweighing otherwise difficult-to-bridge teacher routines (Meyer 1991).

5. Higher-level institutional arrangements also may explain variability in teacher beliefs and behaviors. Under decentralized school systems, exhibiting fragmented resource-dependencies, diverse professional norms may lead to more variable teacher behavior, compared to centralized, highly regulated structures (Meyer 1979; Stackhouse 1982). One empirical study from the U.S. did find that local environmental forces (heterogeneity of students and the size of local administrative staff) influenced the cohesiveness of teachers' commitment within their school -- but only for schools that were highly dependent upon local sources of finance (as opposed to inner-city schools, which were more dependent upon central state-government funds [Fuller and Izu 1986]).

6. Observational studies of classrooms in two southern African countries, Malawi and our pilot study in Botswana also reveal this teacher- and content-dominant form of instruction (au. citations). Evidence from the Third World does not differ substantially from the normative pattern found in U.S. classrooms (Goodlad 1984).

7. We must distinguish between central control of teacher behavior versus central influence over student performance. The state or local education offices may mandate certain teacher behaviors, such as coverage of a standard syllabus or curricular content. In the U.S., such controls appear, in some cases, to have influenced actual classroom behavior (for review, Rowan 1990). But the behavioral change of teachers is not always in the intended direction, and effects on students' own motivation and performance may be minimal (Meyer 1979; in the Third World, authors' citation).

8. Our pilot study focused on assessing reliabilities of the classroom observation instrument: among different observers and across three time-points. These results are reported in greater detail in (au. citations). The pilot study also included development of a pupil achievement measure which is directly linked to the secondary school curriculum. Eventually we will report on whether observed teacher behaviors (as well as teacher characteristics and organizational factors) influence pupil achievement over one school year. The research project also is looking at whether curricular and teacher-training interventions have changed actual teacher behavior in the classroom.

9. For continuous measures, we also calculated the mean deviation between observers and divided this into the mean value for a particular measure. One less reliable indicator, for instance, was the observer's estimate of the percent of time the teacher was requiring choral recitation. The mean value across the sample was 29.8%; but the mean difference between paired observers was 11.2, equaling .38 of the overall mean. Once this item was combined with percent of time teacher was lecturing at children, this inter-observer difference declined (since lecturing and choral recitation often occurs together). The only measure remaining in the analysis which held low reliability was the number of "open-ended questions" asked by the teacher. The average frequency was very low, .73 (over the ten-minute Segment 4). The mean difference between paired observers equaled .42. Our ability to explain variation in this teacher behavior is compromised by the low reliability. A complete listing of *K* values and mean-deviation scores appears in (authors' citation).

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Table 1
Mean Characteristics of Teachers and Their Classrooms
by Teachers' Gender, Ethnicity, and Subject Specialty

	Females n=113	Males n=170	Africans n=216	Expatriates n=75	Mathematics n=54	Social Studies n=43
Teacher Background						
Childhood house had thatched-roof (% answering yes)	55%	64%	79%	10%	65%	77%
Childhood house had electricity	46%	36%	17%	94%	32%	19%
Father's years of schooling	10.8 (4.1)	10.0 (4.5)	9.4 (4.7)	12.4 (2.2)	9.5 (4.7)	10.5 (4.7)
Total teaching experience (years)	3.9 (4.3)	4.6 (4.9)	3.8 (4.2)	5.8 (5.5)	4.6 (5.2)	4.4 (5.2)
Tenure at this school (years)	2.3 (2.6)	2.1 (1.5)	2.1 (1.4)	2.4 (3.1)	2.4 (1.9)	2.6 (1.6)
Annual salary (US$)	4920 (1632)	5160 (1662)	5010 (1438)	5247 (2152)	5460 (1328)	5042 (1552)
Teacher Training and Curricular Role						
Percentage of teachers with more than 2-year diploma	28%	31%	11%	81%	21%	17%
Percentage of teachers teaching:						
English	28%	23%	24%	60%	--	--
Setswana	23%	9%	20%	0%	--	--
Mathematics	16%	20%	20%	13%	--	--
Social Studies	12%	16%	18%	7%	--	--
Other subjects	21%	29%	18%	20%	--	--
	(100%)	(100%)	(100%)	(100%)		
Classroom Characteristics						
Number of textbooks counted per pupil	.76	.77	.79	.71	.85	.77

Note: Total number of teachers (n) equals 244 for which complete data are available.

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Table 2
Selected Mean Teaching Behaviors (dependent variables)
by Teacher Gender, Ethnic Background, and Subject Specialty

	Females n=113	Males n=170	Africans n=216	Expatriates n=75	Mathematics n=54	Social Studies n=43
Technical Complexity/Instructional Tools						
No. of teaching materials used by pupils (per observation)	3.1 (1.9)	3.6 (2.0)	3.2 (1.9)	3.9 (2.0)	4.7 (2.0)	2.8 (1.8)
No. of instances pupils reading	0.4 (0.4)	0.4 (0.5)	0.4 (0.4)	0.5 (0.5)	0.4 (0.4)	0.4 (0.4)
No. of instances pupils writing	0.6 (0.6)	0.7 (0.6)	0.6 (0.6)	0.7 (0.6)	1.3 (0.7)	0.6 (0.4)
Teacher's Questioning Behavior						
No. of close-ended questions asked by teacher (per observation)	6.3 (5.4)	5.4 (4.8)	5.7 (5.1)	6.0 (4.9)	7.4 (5.8)	4.8 (4.0)
No. of open-ended quetions asked by teacher	2.2 (2.2)	2.3 (3.0)	2.3 (2.7)	2.2 (2.8)	0.7 (1.2)	3.8 (3.2)
Teacher's Time Use						
% time spent talking at class and in choral recitation	78% (20)	73% (22)	78% (20)	67% (22)	70% (20)	88% (12)
% time spent monitoring pupils doing written exercises/seatwork	16% (20)	22% (21)	18% (20)	26% (21)	26% (20)	9% (11)
% time spent on administrative tasks and organizing lessons	6% (7)	6% (5)	5% (4)	8% (9)	5% (4)	4% (3)

Table 3

Teacher Characteristics Related to the Complexity/Number of Instructional Tools Used
(unstandardized betas and t-statistics reported)

[Y1A/Y1b]	Observing the teacher			Observing pupils		
	All	Male	African	All	Male	African
Teacher selection policy and demographics						
Teacher gender (female = 2)	1.95 (1.07)	--	0.11 (0.08)	0.22 (0.19)	--	0.50 (0.60)
African teachers (African = 2)	1.38 (0.77)	1.12 (0.65)	--	-0.15 (-0.13)	-0.07 (-0.06)	--
Gender x African	-0.83 (-0.99)	--	--	0.18 (0.15)	--	--
Gender x math	-0.76 (-0.89)	--	-0.59 (-0.58)	-0.72 (-1.21)	--	-0.82 (-1.27)
African x math	-1.23 (-1.10)	-1.64 (-1.17)	--	-0.64 (-0.92)	-0.58 (-0.65)	--
Teacher roles and socialization						
Math class	4.96 (2.08)*	5.07 (1.98)*	2.22 (1.47)	4.31 (2.85)**	3.48 (2.15)*	3.29 (3.40)***
English class	0.40 (0.87)	0.23 (0.39)	0.15 (0.28)	1.25 (4.28)***	1.17 (3.16)**	1.31 (3.84)***
Setswana class	-0.59 (-1.05)	-0.23 (-0.28)	-0.66 (-1.17)	0.20 (0.57)	0.30 (0.58)	0.27 (0.75)
Training level (diploma+ = 2)	-0.78 (-1.25)	0.14 (0.17)	-0.73 (-1.21)	-0.06 (-0.15)	0.72 (1.33)	-0.04 (-0.10)
Tenure (sqroot)	0.47 (1.43)	0.47 (1.05)	0.36 (0.90)	0.28 (1.33)	0.15 (0.53)	0.17 (0.66)
Grade level (1 or 2)	-0.11 (-0.32)	-0.24 (-0.50)	0.02 (0.05)	0.44 (1.88)	0.39 (1.29)	0.35 (1.32)
Textbook availability (books per pupil)	-0.49 (-0.67)	-1.15 (-1.19)	-1.16 (-1.42)	-1.34 (-2.85)**	-1.25 (-2.04)*	-1.98 (-3.75)***
Full equation						
Intercept	1.60	1.33	5.09	2.05	-3.07	-1.88
F-value	2.92***	2.01*	2.10*	6.67***	5.58***	6.55***
DF	12,231	9,137	9,171	12,231	9,136	9,170
Adj. r-square	.09	.06	.05	.22	.22	.22

*p<.05 **p<.01 ***p<.001

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Table 4

Teacher Characteristics Related to Textbook and Exercise Book Use
(unstandardized betas and t-statistics reported)

[YPTEXTBK/YPEXBOOK]	Textbook Utilization			Exercise Book Utilization		
	All	Male	African	All	Male	African
Teacher selection policy and demographics						
Teacher gender (female = 2)	0.01 (0.02)	--	-0.16 (-0.28)	1.49 (1.88)	--	1.20 (2.12)*
African teachers (African = 2)	-0.52 (-0.70)	-0.09 (-0.13)	--	1.43 (1.91)	0.90 (1.22)	--
Gender x African	0.01 (0.04)	--	--	-0.25 (-0.71)	--	--
Gender x math	-0.01 (-0.01)	--	0.17 (0.38)	-1.06 (-2.64)**	--	-1.25 (-2.81)**
African x math	0.12 (0.27)	-0.27 (-0.49)	--	-1.12 (-2.39)*	-0.82 (-1.37)	--
Teacher roles and socialization						
Math class	0.86 (0.85)	1.62 (1.57)	0.84 (1.25)	4.76 (4.64)***	3.17 (2.89)**	2.83 (4.30)***
English class	1.81 (9.25)***	1.83 (7.74)***	1.58 (6.56)***	0.02 (-0.13)	-0.08 (-0.34)	0.08 (0.35)
Setswana class	0.89 (3.68)***	1.22 (3.67)***	0.83 (3.28)**	-0.11 (-0.47)	-0.13 (-0.39)	-0.07 (-0.30)
Training level (diploma+ = 2)	-0.32 (-1.21)	-0.30 (-0.89)	-0.27 (-0.98)	-0.11 (-0.42)	0.31 (0.85)	-0.13 (-0.49)
Tenure (sqroot)	0.07 (0.55)	0.02 (0.15)	0.14 (0.81)	0.17 (1.25)	0.21 (1.11)	0.19 (1.07)
Grade level (1 or 2)	0.44 (2.82)**	0.53 (2.75)**	0.27 (1.48)	0.05 (0.37)	-0.07 (-0.37)	0.08 (0.48)
Textbook availability (books per pupil)	0.02 (0.07)	0.12 (0.24)	-0.41 (-1.10)	-0.89 (-2.81)**	-1.01 (-2.43)*	-1.12 (-3.13)**
Full equation						
Intercept	-3.54	-4.80	-3.15	-3.66	-1.89	-1.26
P-value	8.72***	6.98***	5.67*	5.83***	5.86***	4.97***
DF	12,231	9,137	9,170	12,231	9,136	9,170
Adj. r-square	.28	.27	.19	.19	.23	.16

*p<.05 **p<.01 ***p<.001

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Table 5

Teacher Characteristics Related to Frequency of Written Exercises
(unstandardized betas and t-statistics reported)

[Y2B_WRIT]	Frequency of Written Exercises		
	All	Male	African
Teacher selection policy and demographics			
Teacher gender (female = 2)	1.07 (1.50)	--	1.57 (3.04)**
African teachers (African = 2)	0.10 (0.15)	-0.45 (-0.75)	--
Gender x African	0.05 (0.17)	--	--
Gender x math	-1.15 (-3.18)**	--	-1.48 (-3.64)***
African x math	-0.40 (-0.94)	0.20 (0.41)	--
Teacher roles and socialization			
Math class	3.96 (4.29)***	1.79 (2.01)*	3.67 (6.08)***
English class	0.15 (0.89)	0.12 (0.59)	0.30 (1.41)
Setswana class	0.01 (0.04)	0.05 (0.18)	0.05 (0.23)
Training level (diploma+ = 2)	0.05 (0.21)	0.47 (1.57)	0.02 (0.08)
Tenure (sqroot)	0.09 (0.76)	0.18 (1.19)	0.05 (0.32)
Grade level (1 or 2)	0.08 (0.60)	-0.20 (-1.25)	0.20 (1.22)
Textbook availability (books per pupil)	-0.80 (-2.81)**	-1.00 (-2.98)**	-0.95 (-2.90)**
Full equation			
Intercept	-2.58	-0.19	-3.40
F-value	8.58***	12.07***	8.97***
DF	12,231	9,136	9,170
Adj. r-square	.27	.41	.29

*p<.05 **p<.01 ***p<.001

Appendix

Teacher Characteristics Related to Classroom Time-use and Teacher Questioning
(unstandardized betas and t-statistics reported)+

[SQ_YT1,2,3]	% Teacher Talk and Recitation		% Monitoring Pupil Esercises		Frequency of Open-ended Questioning	
	All	African	All	African	All	African
	1	2	3	4	5	6
Teacher selection policy and demographics						
Teacher gender (female = 2)	-2.48 (-2.18)*	0.28 (0.33)	-3.75 (-2.24)*	-0.05 (-0.04)	0.14 (0.23)	-0.12 (-0.29)
African teachers (African = 2)	-2.37 (-2.15)*	--	-2.26 (-1.39)	--	0.17 (0.30)	--
Gender x African	1.33 (2.54)*	--	1.71 (2.23)*	--	-0.21 (-0.79)	--
Gender x math	-0.21 (-0.12)	-0.21 (-0.31)	0.21 (-0.25)	-0.01 (-0.01)	0.21 (0.70)	0.08 (0.24)
African x math	-0.12 (-0.18)	--	-0.73 (-0.73)	--	0.03 (0.09)	--
Teacher roles and socialization						
Math class	1.23 (0.86)	1.13 (1.12)	2.33 (1.09)	1.26 (0.85)	-1.18 (-1.53)	-0.97 (-1.97)*
English class	-0.13 (-0.46)	-0.10 (-0.28)	-0.28 (-0.65)	-0.29 (-0.52)	-0.01 (-0.02)	-0.04 (-0.24)
Setswana class	-0.35 (-1.03)	-0.32 (-0.90)	-1.03 (-1.99)*	-0.97 (-1.77)	0.32 (1.77)	0.28 (1.56)
Training level (diploma+ = 2)	0.77 (2.05)*	0.78 (2.02)*	1.47 (2.42)*	1.43 (2.28)*	-0.21 (-1.03)	-0.22 (-1.11)
Tenure (sqroot)	-0.07 (-0.37)	-0.53 (-2.03)*	-0.19 (-0.66)	-0.80 (-2.01)*	0.11 (1.05)	0.36 (2.76)**
Grade level (1 or 2)	0.46 (2.01)*	0.57 (2.09)*	0.49 (1.45)	0.68 (1.67)	0.03 (0.31)	0.01 (0.01)
Textbook availability (books per pupil)	-0.88 (-1.94)	-0.86 (-1.61)	-1.52 (-2.24)*	-1.86 (-2.28)*	0.21 (0.90)	0.23 (0.88)
Full equation						
Intercept	7.03	2.20	5.33	0.74	1.78	1.82
F-value	3.74***	2.66**	4.31***	3.54***	3.55***	4.70***
DF	12,212	9,157	12,202	9,146	12,232	9,171
Adj. r-square	.13	.08	.16	.13	.11	.16

+ All three dependent variables have been transformed into the square roots of raw values to remedy skewness in the original distribution.

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